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UNITED STATES OF AMERICA.

# A REPORT

TO THE

# BOARD OF HEALTH

OF THE

# CITY OF CHICAGO,

ON THE NECESSITY OF AN EXTENSION OF THE SEWERAGE OF THE CITY.

BY


## JOHN H. RAUCH, M. D.,

SANITARY SUPERINTENDENT.


PUBLISHED BY ORDER OF THE BOARD.


CHICAGO:

OTTAWAY, BROWN & COLBERT, PRINTERS, 7 & 9 S. JEFFERSON STREET.

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# SEWERAGE.

The necessity of the systematic drainage of Chicago was not fully appreciated until it had suffered from epidemics for six years in succession, five of cholera and one of dysentery; the death rate during this period being higher than in any city in the United States. As the result of this terrible experience, on February 14, 1855, an act was passed by the Legislature of Illinois, creating the Board of Sewerage Commissioners. In compliance with the act, the commissioners were elected as prescribed, and steps immediately taken to give practical effect to the same, in surveys, and in the consideration of plans for the drainage of the city. The plan proposed by Mr. Chesbrough was adopted in December, and in 1856 the work of constructing sewers commenced. This has mainly been adhered to since and prosecuted with varying vigor and effect, as will be seen by the following table showing the number of feet built annually, population, mortality, and death rate:

| YEAR. | *Feet.* | *Population.* | *Mortality.* | *Death Rate per* 1000. |
|---|---|---|---|---|
| 1856 | 31,794 | 84,113 | 2,086 | 24.80 |
| 1857 | 25,681 | 93,000 | 2,414 | 25.66 |
| 1858 | 101,879 | 84,000 | 2,255 | 26.84 |
| 1859 | 55,208 | 96,000 | 2,008 | 21.36 |
| 1860 | 69,024 | 109,260 | 2,264 | 20.70 |
| 1861 | 2,826 | 120,000 | 2,279 | 18,99 |
| 1862 | 15,685 | 137,030 | 2,835 | 20.69 |
| 1863 | 39,605 | 150,000 | 3,875 | 25.83 |
| 1864 | 25,021 | 161,288 | 4,448 | 27.57 |
| 1865 | 29,948 | 178,492 | 4,029 | 22.57 |
| 1866 | 48,127 | 200,418 | 6,524 | 32.22 |
| 1867 | 89,661 | 225,000 | 4,648 | 21.17 |
| 1868 | 47,841 | 252,054 | 5,984 | 23.74 |
| 1869 | 139,705 | 280,000 | 6,488 | 23.16 |
| 1870 | 78,166 | 299,227 | 7,343 | 24.53 |
| 1871 | 50,392 | 325,000 | 6,976 | 21.46 |
| 1872 | 42,767 | 367,293 | 10,156 | 27.60 |

For the purpose of more clearly showing the influence of this, the most important sanitary movement ever inaugurated in this city, I would call attention to the fact that for the six years commencing in 1849 and ending in 1854 (the six years of epidemics before alluded to), the death rate was

48.92 in a thousand, while for the next succeeding six years, commencing in 1856, with the construction of sewers, and ending in 1861, the death rate was only 22.97, with a marked prevalence of scarlet fever during four of the years. This may be termed the Sewerage Commission period.

We now come to the consideration of the regime of the Board of Public Works, as in 1861 the duties of the Sewerage Commission were merged in this Board. For the next five years, it will be seen that the construction of sewers did not keep pace with the increase of population, and we have an increase in the death rate, as for this time it was 25.77. During this period we had an epidemic of cholera and scarlatina. It was not, however, until the city was again ravaged by cholera that the public became aroused to the necessity of paying more attention to sanitary matters, and in March, 1867, the law was passed providing for the present Board of Health. Since that time this Board has been constantly urging the construction of sewers; in fact, one of the first reports of the Sanitary Committee, made on May 20, 1867, was upon this subject, based upon localities in which cholera had been most prevalent in 1866; and I am sorry to say that the major part of the streets recommended were not drained until within the past two years, and some of them still remain unsewered, although the sewerage of them required no deviation from the general system. Every year since, we have gone through the same process with varying success, at the same time, however, increasing the total built, as will be seen by the table, until 1870. In the next five years the death rate fell to 22.81 in 1,000, or a little less than for the first period after the construction of sewers began, and much less than during the immediately preceding period. It will also be observed that from 1867 to 1871 the annual fluctuations of mortality were not so great, and that the death rate was more uniform, although during this time we lost over 1,400 by scarlet fever.

## RAIN FALL.

That this result is entirely owing to drainage is not claimed, but it can be claimed that it had a marked effect in diminishing the mortality. Yearly fluctuations in mortality occur whether epidemics prevail or not, as will be seen by the following table, and that they are owing, here, to a great extent, to the rain-fall of the year, particularly in the months of July, August and September, and sometimes in the last two weeks in June:

| YEAR. | *July, inches.* | *Aug., inches.* | *Sept., inches.* | *Total 3 mo's. inches.* | *Total year, inches.* | *Death rate per* 1,000. |
|---|---|---|---|---|---|---|
| 1866 | 3.58 | 7.84 | 6.53 | 17.95 | 36.65 | 32.22 |
| 1867 | 1.51 | 2.32 | .40 | 4.23 | 21.26 | 21.16 |
| 1868 | 3.86 | 3.58 | 7.08 | 14.52 | 37.33 | 23.74 |
| 1869 | 3.21 | 1.38 | .89 | 5.48 | 31.66 | 23.16 |
| 1870 | 3.71 | 2.17 | 2.82 | 8.70 | 23.62 | 24.53 |
| 1871 | 2.56 | .50 | .10 | 3.16 | 32.85 | 21.46 |
| 1872 | 4.05 | 2.56 | 6.43 | 13.04 | 28.94 | 27.61 |

It will be observed that in 1866 nearly one-half of the rain-fall occurred in the three months named, and that the death-rate for the year was high. In 1867 only about one-fifth fell in this time and the death rate is correspondingly low; and in 1868 ten inches more rain fell than in the previous year, and there is an increase in the death rate. The next year we find a decrease in the rain-fall, or only about one-sixth of the total, and there is a decrease in the death rate, although there was, proportionately, a greater number of deaths by strictly contagious diseases than for any of the years under consideration. In 1870 there was an increase in the rain-fall during July, August and September, or not quite one-third of the total of the year; and although there was a decided decrease of mortality from scarlet fever; measles and whooping-cough, still there was an increase of the death rate of nearly 1⅓ in 1,000. In 1871 we find the smallest amount of rain for the season under consideration, and there is shown a greater change in the number of deaths than occurred since 1866, or a decrease of over 3 in 1,000; and this is more marked as the death rate for the four previous years had not been excessive. Coming to 1872, we find that almost one-half the rain-fall of the year took place in this period, and that there is an increase of over 6 deaths in 1,000, or a greater change than has occurred since 1866, the year when nearly half the rain of the year fell in July, August, and September, and when cholera prevailed. In the absence of any decided epidemic, the increase in the death rate of 1872 is still more marked. The following table will show how far the mortality in these months is influenced by temperature, and a comparison with the table of rain-fall shows that the rain-fall rather than high temperature, is the most important factor in the death rate, although both operating together increase the mortality. In this table I include June, as the temperature of the last half of this month, about every other year, has a noticeable effect upon the mortality of the succeeding three months.

| Year. | *Mean Daily Temperature.* | | | | *Mean for four months.* | *Death rate for year in* 1,000. |
|---|---|---|---|---|---|---|
| | *June.* | *July.* | *August.* | *Sept.* | | |
| 1866 | 70 | 70 | 71 | 64 | 68.3 | 32.22 |
| 1867 | 72.4 | 72.9 | 72.8 | 66 | 71 | 21.17 |
| 1868 | 66.3 | 81.4 | 73.3 | 63.2 | 71 | 23.74 |
| 1869 | 65.4 | 73.8 | 73.5 | 69.5 | 70 | 23.16 |
| 1870 | 70.2 | 79.6 | 75 | 71 | 73.3 | 24.53 |
| 1871 | 72 | 72.3 | 71.3 | 67 | 70.2 | 21.46 |
| 1872* | 70.8 | 72.4 | 72 | 64 | 69.2 | 27.60 |

*The mean daily temperature at the Dearborn Observatory, according to the obsevations of Prof. Safford, was 3° lower.

This table shows that the mean daily temperature for the four months that influence life most was 68° in 1866, when the mortality was great, and that in 1867 there was an increase of nearly 3°, and a great decrease in the number of deaths; with no change in 1868, and an increase in the death rate; and in 1869 a decrease of 1° in the temperature, and a decrease in mortality. In 1870 there was an increase of 3° of temperature, and although for this year the rain-fall was only three inches more than for the preceding, both causes, no doubt, operated together in increasing the death rate. In fact, the temperature was higher than for any of the years under consideration. In 1871 we find a lowering of temperature of 3°, with a slight rain-fall, and a marked decrease in the death rate; and in 1872 a decrease of 1° of temperature compared with 1871, while the rain-fall was four times greater and a higher death rate than occurred in any year since 1866. The table, therefore, shows that high temperature does not have the same effect upon life in this city as the amount of rain that falls, and that in 1866 and 1872 the death rate was highest when the temperature was lowest; and the natural inference is, that by proper drainage much of this waste of life can be prevented. We can regulate the drainage of the city, but not the temperature.

For the purposes of corroboration, and more clearly demonstrating the effect of temperature and rain, attention is called to the following table:

DEATHS.

| Year. | *June.* | *July.* | *August.* | *Sept.* | *Total.* |
|---|---|---|---|---|---|
| 1866 | 319 | 706 | 950 | 739 | 2,714 |
| 1867 | 283 | 597 | 697 | 507 | 2,084 |
| 1868 | 305 | 897 | 945 | 741 | 2,888 |
| 1869 | 434 | 815 | 1,072 | 814 | 3,135 |
| 1870 | 720 | 1,118 | 1,033 | 691 | 3,562 |
| 1871 | 558 | 980 | 890 | 634 | 3,062 |
| 1872 | 813 | 1,372 | 1,551 | 988 | 4,724 |

From the above it will be seen that the alternations in the increase and decrease in the number of deaths occur even with the increase of population, as a general rule, although occasionally there are exceptions, owing to a combination of conditions, such as the prevalence of contagious or epidemic diseases, high temperature and heavy rain-fall in these months; but before the end of the year the difference is made up, and the alternation takes place.

The following table will show the effect of drainage on life, the First, Second, Nineteenth, and Twentieth Wards being omitted, for the reason that no just comparison can be made, owing to the change in population since the Fire.

| Wards. | *Density, square yards, to each inhabitant.* | *Mortality to population, July, August, and September. 1 death in* | *Number of feet of sewers to each inhabitant.* | *Mortality in 1872.* | *Mortality to population in 1872. One death in* |
|---|---|---|---|---|---|
| Third Ward | 93 | 193.5 | 2.66 | 322 | 59.49 |
| Fourth " | 200 | 263. | 3.12 | 216 | 77.92 |
| Fifth " | 234 | 150.5 | 2.33 | 348 | 53.34 |
| Sixth " | 450 | 80.12 | 1.06 | 833 | 37.66 |
| Seventh " | 690 | 65. | .66 | 933 | 29.63 |
| Eighth " | 243 | 81.66 | 1.33 | 940 | 32.18 |
| Ninth " | 76 | 114.2 | 1.66 | 751 | 39.99 |
| Tenth " | 84 | 237.75 | 3.83 | 251 | 66.23 |
| Eleventh " | 73 | 142. | 3. | 374 | 49.03 |
| Twelfth " | 170 | 159.33 | 2.5 | 327 | 63.84 |
| Thirteenth " | 790 | 248. | 2.5 | 216 | 67.71 |
| Fourteenth " | 438 | 167. | 1.06 | 302 | 52.62 |
| Fifteenth " | 374 | 65.75 | .87 | 1,482 | 27.02 |
| Sixteenth " | 279 | 74.5 | 1.05 | 577 | 33.10 |
| Seventeenth " | 137 | 77.5 | 2.58 | 464 | 37.74 |
| Eighteenth " | 89 | 104.5 | 2.94 | 394 | 50.70 |

Deaths in hospitals and public institutions, 779.

It will be seen that the health of each ward depends, principally, upon the number of feet of sewerage to each individual in it, no matter what other conditions obtain with regard to the inhabitants. Although the variations or exceptions are more marked in some localities than in others,—the chief ones depending mainly upon density of population, distance from the river, elevation, and natural drainage incident thereto, and to the character of the soil,—this rule holds good. The ward boundaries are necessarily arbitrary in relation to these points. We have in some of the wards a great extent of territory lying on the river and receding several miles therefrom. While, as a general rule, the densely settled portions of these wards are on or near the river, and undrained, and this is particularly the case with the 6th, 7th, and 15th wards; it is also true that about half of their population is thinly scattered over the greater extent of their territory, and on higher ground, thus giving the inhabitants more air, space, and natural drainage. These circumstances go far toward making the sanitary conditions of the population of these wards equal to those of the more wealthy, but more densely populated interior wards, which are more liable, from their position, to suffer from the noxious exhalations from any portion of the city.

The effect of drainage is most marked in the months of July, August, and September, and as a necessary consequence, the differences in ward mortality are much greater than for the entire year. In calculating the number of feet of sewers to population, the sewerage constructed this year has been omitted, as none of it was completed until October, and after that

time this new drainage had but little effect upon life, as the rain-fall for the last three months was unusually light.

The excessive crowding in the drained districts directly adjoining the burnt district had the effect of increasing mortality there, so that the difference between them and the undrained portions of the city is not as great this year as generally occurs.

It will also be remembered that 779 deaths occurred in the hospitals and public institutions of the city, which are not credited to any of the wards; and that fully three-fourths came from the wards in which there is the least drainage, or from that portion of other wards where sewerage is wanting. This will be better appreciated when it is recollected that as a general rule, sewerage is wanting where the poorer, and especially the foreign portion of our population live, and as a necessary consequence, owing to their condition, they are compelled to resort to our public charities for care and treatment, thus making the difference in the ward mortality still greater.

## INFANTILE MORTALITY.

For the last six years I have repeatedly called attention to the great number of deaths under five years of age that occur in this city during the summer months. The following table for six months of 1872, will show the increase of deaths under 5 years of age in the months of July, August, and September, when the lack of drainage is most manifest, compared with the preceding three months.

| | *April.* | *May.* | *June.* | *July.* | *August.* | *Sept.* | *Total.* |
|---|---|---|---|---|---|---|---|
| Total mortality | 756 | 628 | 813 | 1,372 | 1,557 | 988 | 6,114 |
| Under five years | 407 | 309 | 493 | 1,059 | 1,137 | 553 | 3,858 |
| Five years and over | 349 | 319 | 320 | 313 | 420 | 435 | 2,256 |

Between April and May, there is not much difference, but in June, when the "heated term" commences, there is a great increase, and in the next three months we find that 70 per cent. were under five years, and that for the preceding three months there were 55.02 per cent. of the whole number under five years. The following table gives the number of those born in Chicago who died during this time, nearly all of them being under five years of age:

| | *April.* | *May.* | *June.* | *July.* | *August.* | *Sept.* | *Total.* |
|---|---|---|---|---|---|---|---|
| Native parentage | 125 | 37 | 104 | 229 | 166 | 97 | 793 |
| Foreign parentage | 259 | 224 | 364 | 709 | 836 | 393 | 2,785 |
| Excess of foreign parentage | 134 | 151 | 260 | 480 | 671 | 296 | 1,992 |

In the first three months we had 302 deaths of native parentage, and 847 of foreign parentage, a total of 1,149 out of 2,197 of all nationalities, and for the next three months we had 487 of those born of native parentage, and 1,938 of foreign parentage, or 2,425 born in Chicago out of 3,919 of all nationalities. For the first period we have about 2⅔ deaths among those of foreign parentage to one of native parentage, and for the next we have nearly four of foreign to one of native, while it should be, according to population, about two and a half of foreign to one of native. This great excess of mortality among those born of foreign parentage may be accounted for to a great extent by the fact that our foreign population mainly resides in the undrained portions of the city. For a further elucidation of this subject the following table is appended, showing the chief causes of death, nearly all of the decedents being under five years:

| | *April.* | *May.* | *June.* | *July.* | *August.* | *Sept.* | *Total.* |
|---|---|---|---|---|---|---|---|
| Cholera infantum | 6 | 10 | 146 | 549 | 530 | 187 | 1,428 |
| Convulsions | 94 | 71 | 101 | 112 | 116 | 81 | 573 |
| Diarrhœa | 8 | 5 | 53 | 73 | 132 | 63 | 384 |
| Dysentery | 2 | 3 | 26 | 38 | 63 | 30 | 162 |
| Tabes mesenterica | 8 | 14 | 21 | 40 | 38 | 27 | 148 |
| Teething | 3 | 14 | 16 | 25 | 34 | 14 | 106 |
| Total | 119 | 117 | 463 | 837 | 913 | 402 | 2,801 |
| Mean daily temperature, degrees | 48.6 | 57.5 | 70.2 | 72.5 | 72 | 94 | |
| Rain-fall | 2.99 | 3.28 | 3.41 | 4.08 | 2.56 | 6.43 | |

It will therefore be seen that nearly one-half of all deaths resulted from the above-mentioned diseases, and how rainfall and increase of temperature influence infantile life.

An examination of the records shows that the percentage of deaths under 5 years, from 1843 to 1872, inclusive, was 53.57 of the total; from 1849 to 1854, inclusive, 35.57; from 1856 to 1861, inclusive, 56.05; from 1862 to 1866, inclusive, 51.26, and from 1867 to 1872, inclusive, 60.00. I have made these divisions in accordance with the sewerage periods alluded to in the early part of this report. In 1867, we had 57.63; 1868, 62.03; 1869, 63.00; 1870, 62.64; 1871, 56.08; 1872, 58.19 of the whole number of deaths. Lest these differences should not be understood, I would state that up to 1867 the registration of deaths was exceedingly defective, particularly with reference to children, and that this will, in a measure, account for the difference before and since that time; although I am satisfied that the difference would not appear as great if the registration had been accurate. I am also satisfied that the percentage of deaths under five years would have been found to be fully five per cent. higher than stated had complete registration been made, even taking into consideration

that we had here fewer persons who had passed the prime of life, and among whom deaths are proportionally less frequent, than usually obtains in older communities.

From a report of Dr. Toner, of Washington, who has paid much attention to this subject, I find that the United States census shows:

| | *Total Mortality.* | *Mortality under five years.* | *Percentage of Total.* |
|---|---|---|---|
| 1850 | 323,272 | 123,211 | 38.11 |
| 1860 | 392,821 | 168,285 | 42.80 |
| 1870 | 492,263 | 205,213 | 41.28 |

It appears then that for the three periods under consideration, there was a mortality for the entire country of 40.73 per cent. under five years, of the whole number of deaths, or that we have in Chicago, 12.84 per cent. more deaths under five years, according to the records, since 1843, and since 1867, 19.27 per cent. more than the average for the whole country.

## OTHER CITIES.

In New York from 1804 to 1853, inclusive, it was 50.57 per cent., and from 1866 to 1870, inclusive, it was 50.56 per cent. under five years of the total mortality. Philadelphia from 1858 to 1870, inclusive, 45.26 per cent. of the whole number, and in 1871, 41.98 per cent. Baltimore for 1860, '62, '65, '66, inclusive, 47.06 per cent., and Providence from 1865 to 1870, inclusive, 34.45 per cent. of the whole number. St. Louis in 1870, 51 per cent., in 1871, 49 per cent., and in 1872, 50.03 per cent. of the total. It will therefore be seen that the percentage of mortality under 5 years in Chicago is greater than in any of the cities mentioned; in fact, I am pretty well satisfied that it is greater than for any city in the United States. This may seem startling to those who are accustomed to boast that Chicago is the healthiest city in the world, but it is nevertheless true. In judging of this question it must, however, be borne in mind that we have a younger and more vigorous population than any other city, and that proportionately we have more children and fewer deaths of those over fifty years of age. To show the additional cause or causes of this great mortality among children, I would call attention to the following table, showing, by months, the deaths which occurred under six years, in each ward, for the last year. In explanation, I would state that I have taken the deaths under six years as the basis, for the reason that the school census taken in October gives the number of children under six years, but not under five; and although it is not as satisfactory as if the calculations were based upon the deaths under five, it will still give an approximation of what it would be, as there is only about three-quarters per cent. difference.

## INFANT MORTALITY BY WARDS.

| WARDS. | *January.* | *February.* | *March.* | *April.* | *May.* | *June.* | *July* | *August* | *September.* | *October.* | *November.* | *December.* | *Total.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| First Ward, | 4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 4 |
| Second " | -- | -- | 1 | 1 | 2 | 1 | 1 | -- | 2 | 2 | 1 | 2 | 13 |
| Third " | 22 | 11 | 21 | 26 | 9 | 14 | 24 | 25 | 17 | 10 | 12 | 8 | 199 |
| Fourth " | 5 | 13 | 8 | 8 | 5 | 10 | 19 | 20 | 2 | 2 | 2 | 7 | 101 |
| Fifth " | 8 | 14 | 17 | 15 | 6 | 14 | 40 | 30 | 17 | 19 | 12 | 7 | 199 |
| Sixth " | 25 | 39 | 48 | 41 | 22 | 38 | 120 | 121 | 66 | 39 | 30 | 39 | 628 |
| Seventh " | 22 | 36 | 35 | 25 | 39 | 54 | 121 | 149 | 74 | 56 | 31 | 39 | 681 |
| Eighth " | 38 | 49 | 42 | 43 | 36 | 44 | 111 | 141 | 54 | 28 | 35 | 31 | 652 |
| Ninth " | 30 | 33 | 38 | 40 | 23 | 44 | 66 | 88 | 49 | 24 | 29 | 28 | 492 |
| Tenth " | 7 | 12 | 7 | 5 | 9 | 4 | 24 | 13 | 11 | 4 | 7 | 11 | 114 |
| Eleventh " | 18 | 7 | 24 | 21 | 11 | 11 | 36 | 37 | 20 | 10 | 6 | 15 | 216 |
| Twelfth " | 12 | 10 | 18 | 12 | 9 | 17 | 44 | 39 | 15 | 11 | 6 | 9 | 202 |
| Thirteenth " | 6 | 6 | 8 | 9 | 8 | 5 | 18 | 22 | 4 | 5 | 4 | 2 | 97 |
| Fourteenth " | 7 | 7 | 14 | 12 | 13 | 18 | 30 | 31 | 11 | 9 | 20 | 7 | 179 |
| Fifteenth " | 44 | 53 | 53 | 64 | 56 | 119 | 194 | 190 | 96 | 77 | 52 | 62 | 1,060 |
| Sixteenth " | 13 | 21 | 25 | 31 | 21 | 38 | 63 | 95 | 36 | 24 | 13 | 21 | 401 |
| Seventeenth " | 5 | 18 | 12 | 13 | 21 | 37 | 68 | 74 | 46 | 14 | 9 | 21 | 338 |
| Eighteenth " | 10 | 11 | 10 | 20 | 9 | 21 | 48 | 67 | 23 | 21 | 12 | 12 | 264 |
| Nineteenth " | 1 | -- | 1 | 2 | -- | 1 | 11 | 5 | 2 | 3 | 1 | 3 | 30 |
| Twentieth " | 1 | 1 | -- | 1 | -- | 1 | 4 | 5 | 3 | 2 | 3 | 3 | 24 |
| Total | 278 | 341 | 382 | 389 | 299 | 491 | 1042 | 1152 | 548 | 360 | 285 | 327 | 5,894 |

Hospitals and public institutions ..... 233
Total under 6 years ..... 6,127

It will be seen from this table that the Sixth, Seventh, Eighth, Ninth, Fifteenth, Sixteenth, Seventeenth and Eighteenth Wards had the most deaths, and, generally speaking, there is in them the least drainage and density of population. In them there were 45,049 children under six years, and to each one of them 9.99 feet of sewerage, while in the remaining wards under consideration, there were 20,016 children, and 14.50 feet of sewerage to each, with a greater density of population; and there was one death in the first eight wards to 6.72 feet of drainage, while there was only one death to 29.40 feet in the others.

The First, Second, Nineteenth and Twentieth Wards are omitted in these comparisons, owing to the fact that when the year commenced but few people lived in them.

It will also be seen that there were 233 children who died in hospitals and public institutions; and for a more thorough appreciation of the question it is necessary to recollect that they came mainly from the first eight wards under comparison, thus swelling the death rate of the same.

## DIFFERENCES IN MORTALITY.

For the purpose of showing still more clearly the causes of the difference in mortality, the following table has been prepared, in which will be found the percentage of children under 6 years, and deaths among them during certain months of the year:

| Wards. | *Percentage of Population under 6 years.* | *One death in 1872.* | *One death in January, February, March and Apl.* | *One death in June, July, August, and September.* | *One death in October, November, and December.* | *Density of population, one to square yards.* | *Feet of sewerage to each person in ward.* |
|---|---|---|---|---|---|---|---|
| Third Ward | 12 | 11.60 | 29.00 | 29.00 | 77.43 | 93 | 2.66 |
| Fourth " | 11 | 18.10 | 54,52 | 36.31 | 168.36 | 200 | 3.12 |
| Fifth " | 15 | 14.10 | 52.00 | 27.80 | 73.90 | 234 | 2.33 |
| Sixth " | 23 | 11.87 | 48.76 | 21.42 | 69.08 | 450 | 1.06 |
| Seventh " | 20 | 8.47 | 48.69 | 14.46 | 41.71 | 690 | 0.66 |
| Eighth " | 21 | 10.18 | 38.62 | 18.69 | 70.67 | 243 | 1.33 |
| Ninth " | 17 | 10.75 | 37.43 | 21.40 | 65.28 | 76 | 1.66 |
| Tenth " | 8 | 13.36 | 49.00 | 29.21 | 69.27 | 84 | 3.83 |
| Eleventh " | 12 | 10.44 | 32.00 | 21.58 | 72.42 | 73 | 3.00 |
| Twelfth " | 14 | 15.05 | 60.82 | 26.44 | 185.40 | 170 | 2.05 |
| Thirteenth " | 15 | 21.48 | 75.31 | 42.53 | 189.40 | 790 | 2.05 |
| Fourteenth " | 18 | 16.18 | 72.65 | 32.27 | 89.00 | 438 | 1.06 |
| Fifteenth " | 20 | 7.81 | 39.18 | 14.01 | 43.90 | 374 | 0.87 |
| Sixteenth " | 21 | 10.44 | 46.55 | 17.88 | 72.18 | 279 | 1.05 |
| Seventeenth " | 20 | 10.62 | 75.00 | 16.00 | 81.84 | 137 | 2.58 |
| Eighteenth " | 18 | 14.35 | 74.23 | 23.80 | 84.15 | 89 | 2.94 |

The first column represents the percentage of children under six years to the total population, and the next the number of deaths, according to the population under six years in each ward. This not alone shows the want of drainage, but also the effect on life of the crowding incident to the Fire. In the third column are found the deaths for the months of Janary, February, March and April, and it is during this period that crowding exercised a greater influence upon mortality than at any time in the year; this being particularly the case in the Third, Ninth, Tenth, Eleventh, and a portion of the Seventh, Eighth and Fifteenth Wards. Here will also be noticed the change of locality in the population of the city, as in the Seventeenth and Eighteenth Wards the deaths are less than in others where all the conditions are more favorable to life, and this is owing to the fact that during these months population was sparse in them, and, as it increased, there was a corresponding increase in mortality. In the fourth column the result of the want of drainage strikingly appears, particularly in the Sixth, Seventh, Eighth, Ninth, Fifteenth, Sixteenth and Seventeenth Wards. It is also apparent in the Fifth, Eleventh, Twelfth, Fourteenth and Eighteenth Wards by increasing their death rates, while density of population exercised some influence in the Third, Ninth, Tenth, and Eleventh Wards, or what might be properly termed the inner wards of the city. For the last three months of the year there is not the same difference in ward mortality as observed in any of the other periods. Here is seen the effect of the conditions in which the population of the different wards are placed with regard to the comforts and necessaries of life, and in some measure to density; and where there is a deviation it is of a local and not of a general character. There is, however, apparent in certain localities, even in the last three months of the year, the result of the want of drainage;

Infantile life under these circumstances, if it has escaped the direct effects—vitality being depressed,—will more readily succumb to other causes, among them low temperature, which no doubt exercised a marked influence in increasing the death rate, particularly in the Seventh and Fifteenth Wards, in the last two months of the year. The last two columns of this table were added simply for comparison, as I allude to them more especially elsewhere.

## EFFECT OF CONTAGIOUS DISEASES.

In this connection I would call attention to the fact that the infantile death rate is influenced very much by contagious diseases, such as scarlet fever, measles, and whooping cough, which, as a general rule, are incident to childhood. This will, to some extent, explain the fluctuations in the annual percentages, as will be seen by the following table:

| Wards. | *Scarlet Fever.* | *Measles.* | *Whooping Cough.* | *Total.* | *Per cent. under 5 years.* | *Death per 1000, from all causes.* |
|---|---|---|---|---|---|---|
| 1867 | 101 | 88 | 62 | 251 | 57.63 | 21.17 |
| 1868 | 182 | 107 | 86 | 375 | 62.03 | 23.74 |
| 1869 | 573 | 109 | 131 | 813 | 63.00 | 23.16 |
| 1870 | 351 | 95 | 91 | 547 | 62:64 | 24.53 |
| 1871 | 139 | 157 | 73 | 386 | 56.48 | 21.46 |
| 1872 | 145 | 37 | 124 | 306 | 58.19 | 27.60 |

This table shows that the infantile death rate is more affected by these diseases than is the general death rate, which was swelled by 103 in 1871 who lost their lives by burning during the Fire, and by falling walls. Deducting these, both were lower than for any year since 1861. In 1872, the percentage under five years was almost two per cent. higher, notwithstanding a decided decrease in the diseases that for the other years played so prominent a part in increasing the percentage of deaths under five years; while at the same time a large majority of those that died of small-pox were over five years of age; and, in the increase of our population, consequent upon the rebuilding of the city, there was a greater proportion of adults, particularly strong and healthy males. There must, therefore, be a special cause for this increase of mortality, and from the facts adduced, it is safe to assume that the slight rain-fall was the main cause of the low death rate during the months of July, August, and September of 1871, and that the greater rain-fall for the same period in 1872 was the chief cause of the high death rate, the effect of the same being manifest in the great increase of deaths in the undrained portions of the city.

## THE INCREASE OF DEATHS IN 1872.

The increase in the number of deaths in 1872 over 1871 was 3,180, a greater change than has occurred in any two years in the history of the city, no matter what the increase of population was, or whether the city was decimated by cholera or any other malignant epidemic. This was the more noticeable from the fact that there was not a marked epidemic prevalent, although small-pox and cerebro-spinal meningitis existed in the city, but the number of deaths from these and similar diseases was not great enough to cause this change, as will be seen by the following table.

| YEAR. | *Scarlatina.* | *Small Pox.* | *Measles.* | *Whooping Cough.* | *Total.* | *Percentage of mortality by these diseases.* | *Death rate per 1,000 from all causes.* |
|---|---|---|---|---|---|---|---|
| 1856 | 15 | 16 | 16 | 9 | 56 | 2.67 | 24,80 |
| 1857 | 75 | 10 | 39 | 20 | 134 | 5.55 | 25.65 |
| 1858 | 233 | 5 | 22 | 19 | 279 | 12.37 | 26.84 |
| 1859 | 253 | 3 | 10 | 12 | 278 | 13.84 | 21.36 |
| 1860 | 125 | 3 | 15 | 24 | 167 | 7.37 | 20.70 |
| 1861 | 45 | 3 | 26 | 24 | 98 | 4.30 | 18.99 |
| 1862 | 335 | 5 | 38 | 27 | 405 | 14.28 | 20.69 |
| 1863 | 405 | 115 | 28 | 91 | 639 | 16.49 | 25.83 |
| 1864 | 70 | 285 | 135 | 19 | 509 | 11.64 | 27.57 |
| 1865 | 89 | 57 | 20 | 15 | 181 | 4.49 | 22.57 |
| 1866 | 127 | 9 | 166 | 184 | 486 | 7.44 | 32.22 |
| 1867 | 101 | 123 | 88 | 62 | 344 | 7.40 | 21.17 |
| 1868 | 182 | 146 | 107 | 86 | 521 | 8.06 | 23.74 |
| 1869 | 573 | 17 | 109 | 131 | 830 | 12.76 | 23.16 |
| 1870 | 354 | 14 | 95 | 91 | 554 | 7.68 | 24.53 |
| 1871 | 139 | 71 | 157 | 73 | 460 | 6.59 | 21.46 |
| 1872 | 145 | 655 | 32 | 124 | 946 | 9.31 | 27.60 |

## GENERAL CONCLUSIONS.

Attention has already been called to the effect of rain-fall on life, and, after careful investigation, I can come to no other conclusion than that if our system of sewerage had been extended with the same rapidity that it was from 1866 to 1870, this great increase of mortality would not have occurred.

Prepare tables and group data as we may, the same general facts meet us. This is the more noticeable when it is borne in mind that we know positively how many feet of sewers have been constructed, and how many deaths occurred in each ward, but we do not know with absolute certainty what the population was in each year, as in some years it was only estimated, and in 1872 obtained from the school census. With these uncertainties, and making due allowance for all errors, the result is still the same. For the first period of sewer construction ending in 1860, there were built 2.59 feet to one of the population; the next ending in 1866, there was a

falling off to 2.23 feet, and from 1866 to 1870 inclusive, there was an increase to 2.67 feet, and in 1871 a decrease to 2.54, and in 1872 a still greater decrease to 2.43 feet. It will, therefore, be seen that for the last two years the population of the city has been increasing faster than the sewerage has been extended, and that this is the chief cause of the increase in the death rate. Allowing 1,200 of the deaths for increase of population and the direct result of the Fire, 655 that died of small-pox, 425 from crowding and the indirect effects of the Fire, we still have an increase of 900, which, I am satisfied, died from the want of proper drainage.

A comparison of the 18th and 15th Wards will demonstrate the truth of the position taken in regard to sewerage. The first mentioned ward has nearly three feet of sewerage to every inhabitant, while the other has but seven-eights of a foot to each one of the population. What natural advantages there are, such as elevation, &c., are in favor of the 15th ward.

The number of deaths for July, August, and September, of 1872, were 1 in 104 in the 18th ward, and 1 in 65 in the 15th; and for the whole year, 1 in 56.70 in the 18th, and 1 in 27.02 in the 15th. Of those under 6 years, we find in the 18th ward 1 in 14.35, while in the 15th there was 1 in 7.81.

In the 18th ward there are only 89 square yards to each inhabitant, while in the 15th there are 374; but, taking an extent of territory equal to the area of the 18th, from the lower and eastern portion of the 15th, where the greatest mortality occurs, the difference is not so great, while the air space is still greater than in the 18th ward. The density of the population in the 18th ward has been increased since the Fire, by the building of a number of houses by the Relief and Aid Society, on lots on Hawthorne avenue and Elm street, 2 and 3 deep on the same lot, and in a portion of the ward that is undrained. In addition, almost every portion of this ward was burned over, so that the privation, added to the depressing effects of the Fire, no doubt had some influence in increasing the death rate.

The 18th ward, as a whole, was naturally lower than any other in the city, until sewers were constructed and the streets improved. These wards are selected for the purpose of comparison because they are more nearly alike than any two in the city, and lie on the North Branch, directly opposite to each other. Taking all things into consideration, the 18th is the poorest ward in the city. Every portion of the ground is clayey, and was originally low, and its inhabitants are nearly all of the poorer class of our foreign population, of different nationalities, as is also the case in the 15th ward, with the exception that there are more Irish in the 18th than in the 15th.

At no time since the construction of sewers commenced in this city have they been adequate to the sanitary requirements, and as long as this state of things continues, owing to the topography and character of the soil upon which the city is built, we must expect to have a high death rate, par-

ticularly among children. The general death rate is not as high as in some other cities; but, as I have before shown, the infantile death rate is higher than in any large city in the United States.* There are, however, parts of the city where the infantile death rate is as low as in any portion of the United States.

## THE AREA NEEDING SEWERAGE.

From W. H. Clark, Esq., of the Sewerage Department, to whom I am indebted for many other facts pertaining to this subject, I learn that there are 14,678 acres in the territory east of Western avenue, within the city limits. Of these, only 4,372 acres are drained, and about 4,000 more need sewerage at this time. Sanitary necessity demands the immediate addition of about 5,000 feet to the drainage of the western and northern portion of the Fourth Ward, although the death rate of the ward is very low. As in every other instance, however, the poorest portion, and that which needs drainage most, is undrained. This addition to the present drainage would, no doubt, materially diminish the death rate. In the western and northern part of the Fifth Ward much good can be accomplished by about 9,000 feet. Draining every street north of Twenty-second that is unsewered in the Sixth Ward, and extending the system to Twenty-sixth street, and along the river, to the extent of 16,000 feet, is also needed. In the Seventh Ward, where, for the last two years, we have had the highest death rate, about 17,000 feet is required. It is specially important that all the streets east of Halsted should be sewered, as population there is dense, and natural drainage very defective; and that Morgan street be sewered,—although population is not so dense there,—but for the purpose of relieving a densely populated district in the Eighth Ward, that has no other outlet. With 9,000 feet, the pressing necessities of the Eighth Ward can be relieved, and its sanitary condition much improved. The building of 8,000 feet in the Ninth Ward is demanded, as there are streets in it that are in as bad a condition, taking everything into consideration, as any others in the city. It is specially important that a ward so centrally located and

*GENERAL DEATH RATE OF THE LARGER CITIES OF THE UNITED STATES FOR 1871, '72.

| Cities. | *Pop.* 1870, *Census.* | *Deaths.* 1871. | *Death Rate per* 1000. | *Pop.* 1872. *Estimated.* | *Deaths.* 1872. | *Death Rate per* 1000. |
|---|---|---|---|---|---|---|
| New York | 942,292 | 26,976 | 28.63 | 1,000,000 | 32,647 | 32.64 |
| Philadelphia | 674,022 | 15,485 | 22.95 | 750,000 | 18,987 | 25.34 |
| Brooklyn | 396,099 | 10,259 | 25.11 | 415,000 | 12,458 | 30.00 |
| St. Louis | 310,864 | 5,265 | 16.93 | 400,000 | 8,047 | 20.11 |
| Chicago | 299,227 | 6,976 | 23.31 | *367,293 | 10,156 | 27.60 |
| Baltimore | 267,354 | 7,141 | 26.71 | -------- | ------ | ----- |
| Boston | 250,526 | 5,888 | 23.49 | 265,000 | 8,089 | 30.89 |
| Cincinnati | 216,239 | 4,832 | 22.34 | 250,000 | 5,075 | 20.30 |
| New Orleans | 191,418 | 5,595 | 29.22 | 200,000 | 6,122 | 30.60 |
| San Francisco | 149,473 | 3,214 | 19.85 | 186,000 | 3,154 | 16.90 |

*School Census, Oct. 1.

densely populated should be thoroughly drained. The Tenth Ward needs about 2,000 feet; and in the Eleventh there are still streets undrained, and near the river, where from character of soil and density of population it is important to build at least 5,000 feet. Although the mortality of the Twelfth Ward is not so high as in many others, still, as obtains in other portions of the city, the poorest part, from all standpoints, is undrained, and the construction of 7,000 feet would greatly diminish the death rate. The Thirteenth Ward is really one of the best wards in the city, but the addition of about 6,000 feet would add materially to its healthfulness. We now come to the Fourteenth Ward, which has the least amount of sewerage as a ward, but its death rate, owing to character of population, elevation and air space, is lower than many others; but the addition of 9,000 feet would be advisable. Between the Seventh and Fifteenth Wards, for the last three years there has existed a rivalry as to which should have the highest death rate, both having about the same number of feet of sewers to each individual, which, however, is less than in any of the other wards. Eighteen thousand feet are immediately needed to relieve the latter from much sickness and death. It is the most populous, and at the same time, one of the largest wards, has a great river front, and the soil of every portion of it is clayey, where drainage is consequently more needed, from sanitary considerations, than in a sandy soil. Coming to the North Side, the Sixteenth Ward needs, immediately, about 14,000 feet, and the western part of the Seventeenth, 9,000; the Eighteenth, about 5,000, and the Nineteenth, 3,000 feet to complete its drainage.*

The construction of the sewerage alluded to in the different wards can be carried on without deviation from the general system, and if made in streets recommended by this Board, will, in my opinion, diminish the death rate of the city five per cent., and I have no doubt that if every portion of the city that is now in want of drainage was sewered, the death rate, as a general rule, would be reduced 12 per cent.; the infantile, nine; and over 5 years, three per cent., making it one of the healthiest large cities in the world, which, I am sorry to say, it is not now, owing more to the want of drainage than anything else.

## THE EFFECT OF SEWERS ALREADY BUILT.

The construction of sewers under the Sewerage Commission, in its effect on life, was marked, and the sewers were located on streets where it was most beneficial from a sanitary standpoint, and in accordance with the spirit and intent that gave origin to the Commission. In 1862 we find that a sewer was built by order of the Common Council, 4,572 feet in length, and 4½ feet in diameter, on a street, at that time, sparsely popu-

* The sewers at Twelfth and Twenty-Second streets, emptying into the Lake, should be extended, for when the Lake is low and the wind is in a favorable direction, the exhalations from the sewage are exceedingly offensive to the neighborhood.

lated; the sewer running farther west than any other on the West Side; and it was built more for the pecuniary benefit of interested parties than from any other consideration. The cost of this sewer was equal to half of the amount expended on the West Division, while there were localities where population was more dense, and nearer the centre of the system, and where much more good could have been accomplished. In 1869 a sewer was built, 5,348 feet in length, costing $118,000, or nearly one-fifth of the total expended for sewerage during that year, which, at that time, did not drain a territory whereon 300 people lived, while this amount of money could have been expended in localities where 20,000 persons would have been benefited, and where it was a necessity. At the present time however, the sewer is needed, as population has very much increased in that neighborhood, and it is required to carry out the general system. Even as late as last year an order was passed by the Council for the drainage of Vincennes avenue and Langley Place, among the highest and best streets in the city, and far remote from the centre of population, to the exclusion of streets in the western portion of the Fourth and in the Sixth Ward where it is much more needed, and would be at least two miles nearer the heart of the city. Many other instances have occurred, within my official experience, where interested parties have secured sewerage, even to a deviation from the system, when other streets, not far remote and strictly in accord with the system, were neglected, although sewerage in them was much more needed, owing to their density of population, low ground, and nature of soil. Little did these parties think or care that their comfort and the enhanced value of their property, incident to drainage, was at the expense of the lives of some of their fellow beings, to whom life was as near and dear as to themselves.

## OUR SANITARY DUTIES.

The sewerage system of this city had its origin in a sanitary necessity, and it is strictly a sanitary measure. All sewers should be located in reference to these considerations, and no others. In speaking thus I do not wish to be understood as saying that I do not want the better portion of the city drained, for, on the contrary, I am exceedingly anxious to have every part of it sewered. The drainage of the poorer parts of the city, where population is dense, should be the first care of the municipal authorities. Those living in such districts are least able to control the conditions that affect health, and, therefore, are legitimate objects of the city's care.

By strictly pursuing this course we shall have the co-operation of those who are remote from the centre of the Sewerage system—most of whom will be interested, not alone from sanitary, but from pecuniary considerations; and, thus, the drainage of the entire city will be more quickly secured

than if the sewerage funds were expended wherever personal or political influence could divert it.

## DEFECTS OF OUR ORDINANCES.

The pressure brought to bear upon the Board of Public Works and the Common Council, for the last two years, by interested parties to secure drainage, has been very great, and in many instances, where they were unsuccessful by direct means, they secured the passage of orders by the Common Council for paving the streets, which is paid for by the property owners, which involved, and indeed compelled prior sewerage as a matter of economy before the paving of the streets, to the neglect of other streets where drainage was more needed. It will, therefore, be seen that the advantage with regard to securing drainage has always been on the part of those best able to take care of themselves.

It has been urged by some that many of the poorer people were too filthy, and that when sewers were constructed they were unwilling to avail themselves of the benefits arising therefrom. While this is true in some instances, still this fact does not relieve this Board or the City from their duty in this respect. Assuredly good drainage stimulates cleanliness; in fact, there are portions of the city where nothing can be done in the way of improving the sanitary condition until drainage is first secured. Its effect upon life is, to a great extent, insensible; it is not seen, and, therefore, by many not appreciated. Let the present law with regard to sewer connection be changed, as this Board has advocated for the last five years, and I cannot better show the necessity for it than by making an extract from the last report of the late lamented Health Officer, Ambrose Burnham, in which he says, speaking of this subject, and referring to the section of the Act under which sewer connections are enforced: "This section seems to have been gotten up in the interest of land and lot owners, and works great wrong and injustice to poor people, who lease these lands and lots, many of them not being able, financially, to put in the said sewer connection, as required by the section. The improvement is a permanent one, and should be made by the party owning the fee simple. Another reason is, the leases run from the time of notice to put in such connections from one month to one or nine years, and many of them from year to year, and some are subject to vacate premises on ten or more days' notice. It is utterly useless to sue the poor tenants, under the circumstances, and fine them, for they cannot pay the fine, and to work it out in the Bridewell will not drain the land, or abate the nusiance caused by lack of drainage; it will not benefit the city, but will work a great wrong to the tenant and those who are dependent on said tenant for their bread from day to day."

A bill was prepared, making the property-owner responsible for the sewer connection when the lease of the ground did not extend over five

years, but from some cause or other we never succeeded in having it made a law. If this change were made there would be no trouble in compelling sewer connection in the poorer wards.

## THE UNDRAINED DISTRICTS.

An examination of the sewerage map shows that, as a rule, the highest portions of the city, where our wealthier people reside, have the most sewerage. The sewers extend south from the Chicago River four miles, and two and a half north, on the lake shore; west two and a half miles from the river in the central and highest portions of the West Side, while there are districts unsewered much nearer to the river. The Chicago River is the centre of the system, and the territory near it is generally low, and the soil clayey, and the necessity for its drainage greater than where it is high and sandy. In fact, the drainage of all the territory on and near the river, where population is dense, is the great sanitary necessity of the city at this time, as has already been shown by the mortality statistics. The more complete the drainage is near the river the better it will be for those who live more remote from it; and although they may not immediately get sewers, still the effect of those built near the river will be felt by them, as it necessarily removes the "ground water," from a lower locality than where they are. It must also be recollected that drainage influences nearly all diseases, and that contagious and epidemic diseases are rendered more malignant and fatal by the want of it, so that even those who live away from the pestilential spots are endangered; thus it is not alone a matter of duty, but one of safety to those that are better situated to see that the poorer element of our community is cared for in this respect. In fact, there is an inseparable community of interests in this matter.

## THE FINANCIAL ASPECT OF THE QUESTION.

We now come to the consideration of the financial aspects of this question. It has already been demonstrated that much sickness and loss of life can be prevented, the value of which, from a pecuniary standpoint, can scarcely be estimated. Our hospitals, almshouses, and charitable institutions are mainly recruited from the unsewered districts of the city, and in this way there is entailed upon the community a great expense, which could, at least, be partially averted, and which is quite an important matter in an economical view, independent of the humane considerations involved.

The amount of money expended on the sewerage of the city, as obtained from the Records of the Board of Public Works, is as follows: To 1861, $665,188.46; 1861, $3,617.31; 1862, $57,264.51; 1863, $169,299.29; 1864, $87,221.48; 1865, $137,643.02; 1866, $225,564.53; 1867, $416,730.51; 1868, $197,152.92; 1869, $654,141.26; 1870, $258,684.70; 1871, $123,878.92; 1872, $126.643.

It will, therefore, be seen that during the last two years the amount ex-

pended is not equal to that of 1870, and, during the last three years is only slightly in excess of two-thirds of that of 1869. The reason why no more sewers were built during the last two years is due to the simple fact that not sufficient money was provided by law for such purposes.*

## SPECIAL ASSESSMENTS.

Early in 1870, in a report on the subject of sewerage, made by myself, occurs the following: "I have for some time been of the opinion that if the system of special assessments were inaugurated, so far as sewerage was concerned, it would, to some extent, put a stop to the rapidly increasing debt of the city, and to all complaints of favoritism in the location of sewers, and result in the construction of a greater number. There is a peculiar propriety in making this improvement in this way, as the benefits derived are of a more local character than even in street improvements. It certainly is of more importance to the party who lives upon the lot than to the public generally. Should such a change be made, an equitable arrangement should also be made with regard to the present sewerage debt. In view of the adoption of the new Constitution, which prevents the contracting of municipal debts beyond a certain amount, and as the limit has already been nearly reached, I think it a matter of much importance to this city to give this subject due consideration."

The new Constitution went into effect August 8, 1870, and in January, 1871, at the next meeting of the Legislature, a Bill was introduced, prepared by Corporation Counsel Tuley, on the recommendations of the Board of Public Works and the Board of Health, embodying the principle of special assessments, and providing that the sewers should be located on the recommendation of the Board of Health. Much opposition was manifested to the Bill, mainly on the ground of unfairness, which was more imaginary than real, and the Bill was defeated. The present law authorizing the levying of one mill for this purpose was then introduced and passed, although I, at the time, said that the sum was too small, as experience has demonstrated; had the Bill prepared by Mr. Tuley been passed, I am satisfied that the death rate this year would have been considerably lower. The only way now left is either to increase the mill tax or resort to special assessments. In making estimates it must also be borne in mind that owing to the increase of the sewerage on the North and West Sides, the cleansing of the North Branch becomes a greater necessity, and some provision must be made for this improvement. In other words, the expenditure of more money for sanitary purposes is an absolute necessity. The building of sewers should be commenced each year as soon as the frost is out of the ground, in order to secure the benefits arising therefrom to as great an

* The expense entailed in securing drainage by gutters in unimproved and unsewered streets, and in the frequent cleaning of them, would pay a not inconsiderable portion of the interest of the monies expended for the construction of sewers.

extent as possible during the summer months. Under our present system the money for sewerage purposes, for the year, is not appropriated until about the first of July, and sewer construction does not begin until the middle of August, and none of them are completed until late in October, when their influence upon life is comparatively slight.

## EXPENDITURES OF THE BOARD.

In this connection it may not be out of place to call attention to the expenditures of this Board. The Board of Police, controlling sanitary matters in 1866, expended for these purposes, when the population of the city was 200,418, $79,687.15, and the Common Council appropriated for our expenditures this year the sum of $53,520.00, while we have, at this time, 167,000 more people, and when, in fact, it is much more difficult and expensive to accomplish our work now than it was at that time. When the Board was first organized, and with the fear of cholera, money was obtained without much trouble; but for three years, although the sums asked for by the Board were less than was appropriated for the first year, and with an increasing population, not enough was allowed even to secure a working force, managed in the most economical manner, sufficient to do what was absolutely necessary; and, therefore, second appropriations had to be made. In 1871, a friend of the Board was compelled to advance money to some of the employees, whose services could not be dispensed with, to keep them from actual want until this second appropriation was made. The disposition seems to be to appropriate as small an amount of money as possible for sanitary purposes. Is it desirable that the deplorable condition that necessitated our present sewerage system should be repeated on account of a mistaken economy? There is a municipal responsibility in this respect that cannot be ignored.

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